CLAIMS

What is claimed:

1. A system for fabricating polymer microparticles, comprising:

(a) a stamp, wherein said stamp further comprises micro-structures on at least one side of said stamp for receiving a layer of said polymer;

(b) a substrate; and

(c) a layer of dissolvable material covering said substrate.

2. The system of claim 1, further comprising a compression means for compressing said stamp against said substrate.

3. The system of claim 1, further comprising a solvent for dissolving said layer of dissolvable material.

4. The system of claim 3, further comprising a reservoir for said solvent.

5. The system of claim 1, wherein said polymer is polypropyl methacrylate, polylactic-co-glycolic acid, polycaprolactone, polymethyl methacrylate, or polystyrene.

6. The system of claim 1, wherein said stamp is a polydimethyl siloxane stamp.

7. The system of claim 1, wherein said micro-structures further comprise a plurality of micro-pillars.

8. The system of claim 1, wherein said micro-structures further comprise a plurality of micro-wells.

9. The system of claim 1, wherein said substrate is a glass slide.

10. The system of claim 1, wherein said layer of dissolvable material further comprises polyvinyl alcohol.

11. The system of claim 1, wherein said layer of dissolvable material further comprises a water soluble ink, glucose, chitosan, or polyethylene glycol.

12. A method for creating polymer microparticles, comprising the steps of:

(a) applying a thin, continuous layer of polymer to the contoured side of a stamp, wherein said contours include individual protruding microstructures;

(b) covering the surface area of a substrate with a solution of dissolvable material and allowing said solution to dry on the surface of said substrate;

(c) placing said stamp, polymer coated side down, on said substrate such that said protruding microstructures make contact with said substrate;

(d) applying compression means to the side of said stamp opposite the side that is in contact with said substrate;

(e) placing said substrate, stamp and said compression means on a heat source for a predetermined period of time;

(f) removing said stamp from said substrate; and

(g) placing said substrate in a solvent that will dissolve said dissolvable material and release said polymer microparticles from said substrate.

13. The method of claim 12, further comprising the step of desiccating or filtering said solvent to recover said microparticles from solution.

14. The method of claim 12, wherein said polymer is polypropyl methacrylate, polylactic-co-glycolic acid, polycaprolactone, polymethyl methacrylate, or polystyrene.

15. The method of claim 12, wherein said stamp is a polydimethyl siloxane stamp.

16. The method of claim 12, wherein said substrate is a glass slide.

17. The method of claim 12, wherein said dissolvable material further comprises polyvinyl alcohol.

18. The method of claim 12, wherein said layer of dissolvable material further comprises a water soluble ink, glucose, chitosan, or polyethylene glycol.

19. The method of claim 12, wherein said solvent is water.

20. A method for creating polymer microparticles, comprising the steps of:

(a) applying a thin, continuous layer of polymer to the contoured side of a stamp, wherein said contours include individual recesses;

(b) placing said stamp, polymer-coated side down, on a first substrate;

(c) applying compression means to said stamp sufficient to transfer polymer on the regions between said individual recesses to said first substrate but insufficient to transfer polymer in said individual recesses to said first substrate;

(d) placing said first substrate, stamp and said compression means on a heat source for a predetermined period of time;

(e) removing said stamp from said first substrate and discarding said first substrate;

(f) covering the surface area of a second substrate with a solution of dissolvable material and allowing said solution to dry on the surface of said substrate to form a layer;

(g) placing said stamp, polymer coated side down, on said second substrate;

(h) applying compression means to said stamp sufficient to transfer polymer in said individual recesses to said second substrate;

(i) placing said second substrate, stamp and said compression means on a heat source for a predetermined period of time;

(j) removing said stamp from said second substrate; and

(k) placing said second substrate in a solvent that will dissolve said dissolvable material and release said polymer microparticles from said second substrate.

21. The method of claim 20, further comprising the step of desiccating or filtering said solvent to recover said microparticles from solution.

22. The method of claim 20, wherein said polymer is polypropyl methacrylate, polylactic-co-glycolic acid, polycaprolactone, polymethyl methacrylate, or polystyrene.

23. The method of claim 20, wherein said stamp is a polydimethyl siloxane stamp.

24. The method of claim 20, wherein said substrates are glass slides.

25. The method of claim 20, wherein said dissolvable material further comprises polyvinyl alcohol.

26. The method of claim 20, wherein said dissolvable material further comprises a water soluble ink, glucose, chitosan, or polyethylene glycol.

27. The method of claim 20, wherein said solvent is water.

28. A method for creating polymer microparticles, comprising the steps of:

(a) applying a thin layer of polymer and a first solvent only to the individual recesses on the contoured side of a stamp;

(b) allowing said first solvent to evaporate;

(c) covering the surface area of a substrate with a layer of dissolvable material and allowing said solution to dry on the surface of said substrate;

(d) placing said stamp, polymer coated side down, on said substrate;

(e) applying compression means to said stamp sufficient to transfer polymer in said individual recesses to said substrate leaving said polymer attached to said layer of dissolvable material;

(f) removing said stamp from said substrate; and

(g) placing said substrate in a second solvent that will dissolve said dissolvable material and release said polymer microparticles from said second substrate.

29. The method of claim 28, further comprising the step of desiccating or filtering said second solvent to recover said microparticles from solution.

30. The method of claim 28, wherein said polymer is polypropyl methacrylate, polylactic-co-glycolic acid, polycaprolactone, polymethyl methacrylate, or polystyrene.

31. The method of claim 28, wherein said stamp is a polydimethyl siloxane stamp.

32. The method of claim 28, wherein said dissolvable material further comprises polyvinyl alcohol, a water soluble ink, glucose, chitosan, or polyethylene glycol.

33. The method of claim 20, wherein said second solvent is water.

34. A method for creating polymer microparticles, comprising the steps of:

(a) applying a thin, continuous layer of a first polymer to the contoured side of a stamp, wherein said contours include individual recesses;

(b) removing said polymer on the face of said stamp between said individual recessed areas;

(c) applying a solution of a material and a first solvent to said individual recesses on top of said first polymer;

(d) allowing said first solvent to evaporate leaving said material in said individual recesses;

(e) applying a thin, continuous layer of a second polymer to the contoured side of a stamp, wherein said contours include individual recesses;

(f) removing said polymer on the face of said stamp between said individual recessed areas;

(g) covering the surface area of a second substrate with a solution of dissolvable material and allowing said solution to dry on the surface of said substrate;

(h) placing said stamp, polymer coated side down, on said second substrate;

(i) applying compression means to said stamp sufficient to transfer polymer in said individual recesses to said second substrate;

(j) placing said second substrate, stamp and said compression means on a heat source for a predetermined period of time;

(k) removing said stamp from said second substrate; and

(l) placing said second substrate in a second solvent that will dissolve said dissolvable material and release said polymer microparticles from said second substrate.

35. The method of claim 34, further comprising the step of desiccating or filtering said second solvent to recover said microparticles from solution.